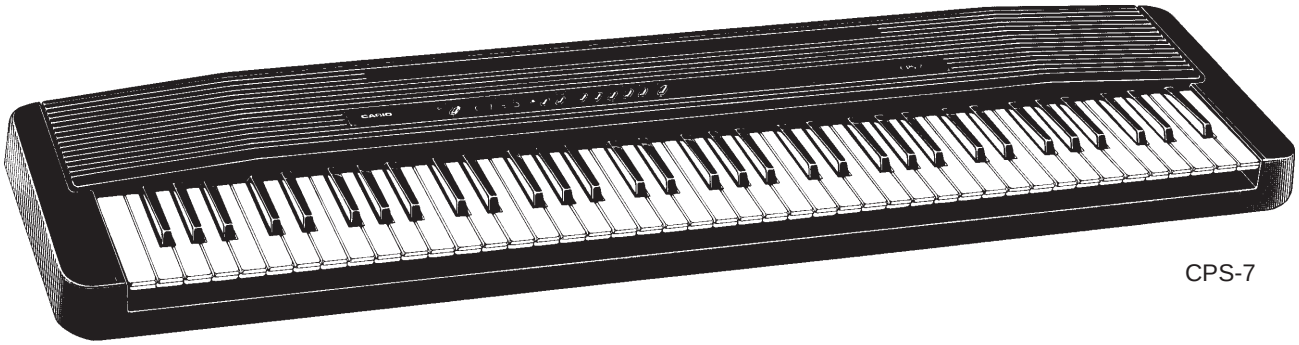
CASIO®

Service Manual

(with price)

CPS-7



CPS-7

ELECTRONIC KEYBOARD

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SPECIFICATIONS

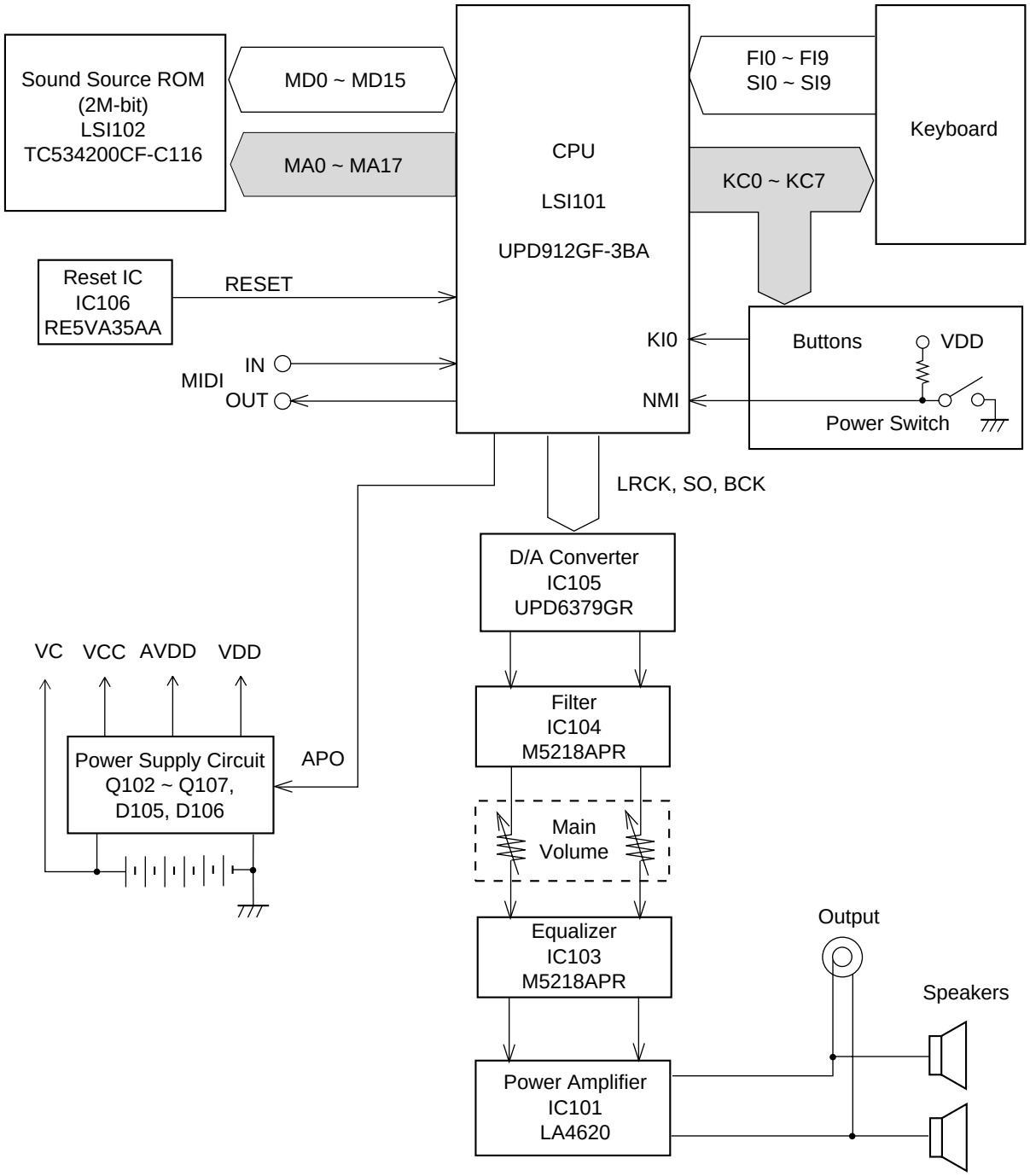
GENERAL

Number of keys:	76
Polyphonic:	24-note
Preset tones:	5, Piano-1, Piano-2, Electric Piano, Pipe Organ, Strings Layer
Touch response:	On/Off
Key transpose:	Range of ± 1 octave by a semitone increment
Demo tunes:	5, 1. Petit Chien 2. Cozy's Castle 3. Red Leaves 4. Toccata & Chorus 5. Rainbow
Tuning control:	440Hz ± 50 cents
Built-In speakers:	12 cm dia. 5 W input rating: 2 pcs.
MIDI:	8-channel, multi-timbral reception
Terminals:	Phone Jack [Output impedance: 47 Ω, Output voltage: 2.6 V(rms) MAX], MIDI Jacks (IN, OUT), Sustain Jack, AC Adaptor Jack (12 V)
Auto power off:	Approximately 6 minutes after the last operation
Power source:	2-way AC or DC source AC: AC adaptor AD-12 DC: 6 D size dry batteries Battery life: approx. 4 hours by manganese batteries R20P/SUM-1
Power consumption:	18 W
Dimensions (HWD):	96 x 1161 x 303 mm (3-3/4 x 45-11/16 x 11-15/16 inches)
Weight:	6.3 kg (13.9 lbs) excluding batteries

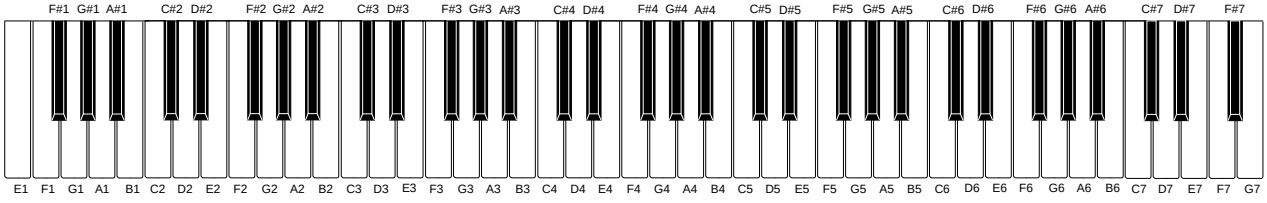
ELECTRICAL

Current Drain with 12 V DC:		
No Sound Output		145 mA ± 20%
Maximum Volume		1470 mA ± 20%
with keys C2 to B3 (24 polyphonic) pressed in Strings tone Volume: maximum, Touch response: maximum		
Headphone Output Level (Vrms with 8 Ω load each channel):		
with key F3 pressed in Strings tone	Left channel	100 mV ± 20%
Speaker Output Level (Vrms with 8 Ω load each channel):		
with key F2 pressed in Strings tone	Left channel	2800 mV ± 20%
Minimum Operating Voltage:		5.8 V

BLOCK DIAGRAM



NOMENCLATURE OF KEYS

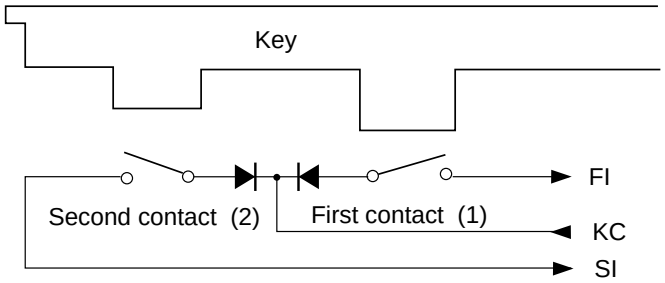


CIRCUIT DESCRIPTION

KEY MATRIX

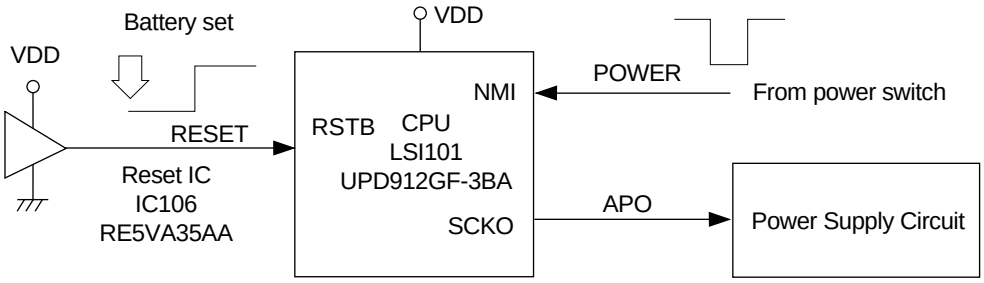
	KC0	KC1	KC2	KC3	KC4	KC5	KC6	KC7
FI0		E1 (1)	F1 (1)	F#1 (1)	G1 (1)	G#1 (1)	A1 (1)	A#1 (1)
SI0		E1 (2)	F1 (2)	F#1 (2)	G1 (2)	G#1 (2)	A1 (2)	A#1 (2)
FI1	B1 (1)	C2 (1)	C#2 (1)	D2 (1)	D#2 (1)	E2 (1)	F2 (1)	F#2 (1)
SI1	B1 (2)	C2 (2)	C#2 (2)	D2 (2)	D#2 (2)	E2 (2)	F2 (2)	F#2 (2)
FI2	G2 (1)	G#2 (1)	A2 (1)	A#2 (1)	B2 (1)	C3 (1)	C#3 (1)	D3 (1)
SI2	G2 (2)	G#2 (2)	A2 (2)	A#2 (2)	B2 (2)	C3 (2)	C#3 (2)	D3 (2)
FI3	D#3 (1)	E3 (1)	F3 (1)	F#3 (1)	G3 (1)	G#3 (1)	A3 (1)	A#3 (1)
SI3	D#3 (2)	E3 (2)	F3 (2)	F#3 (2)	G3 (2)	G#3 (2)	A3 (2)	A#3 (2)
FI4	B3 (1)	C4 (1)	C#4 (1)	D4 (1)	D#4 (1)	E4 (1)	F4 (1)	F#4 (1)
SI4	B3 (2)	C4 (2)	C#4 (2)	D4 (2)	D#4 (2)	E4 (2)	F4 (2)	F#4 (2)
FI5	G4 (1)	G#4 (1)	A4 (1)	A#4 (1)	B4 (1)	C5 (1)	C#5 (1)	D5 (1)
SI5	G4 (2)	G#4 (2)	A4 (2)	A#4 (2)	B4 (2)	C5 (2)	C#5 (2)	D5 (2)
FI6	D#5 (1)	E5 (1)	F5 (1)	F#5 (1)	G5 (1)	G#5 (1)	A5 (1)	A#5 (1)
SI6	D#5 (2)	E5 (2)	F5 (2)	F#5 (2)	G5 (2)	G#5 (2)	A5 (2)	A#5 (2)
FI7	B5 (1)	C6 (1)	C#6 (1)	D6 (1)	D#6 (1)	E6 (1)	F6 (1)	F#6 (1)
SI7	B5 (2)	C6 (2)	C#6 (2)	D6 (2)	D#6 (2)	E6 (2)	F6 (2)	F#6 (2)
FI8	G6 (1)	G#6 (1)	A6 (1)	A#6 (1)	B6 (1)	C7 (1)	C#7 (1)	D7 (1)
SI8	G6 (2)	G#6 (2)	A6 (2)	A#6 (2)	B6 (2)	C7 (2)	C#7 (2)	D7 (2)
FI9	D#7 (1)	E7 (1)	F7 (1)	F#7 (1)	G7 (1)			
SI9	D#7 (2)	E7 (2)	F7 (2)	F#7 (2)	G7 (2)			
KI1	Touch Response	Transpose /Tune/MIDI	Piano-1	Piano-2	E.Piano	Pipe Organ	Strings	Demo

Note: Each key has two contacts, the first conatct (1) and second contact (2).



RESET CIRCUIT

When batteries are set or an AC adapter is connected, the reset IC provides a low pulse to the CPU. The CPU then initializes its internal circuit.
When the power switch is pressed, the CPU receives a low pulse of POWER signal.The CPU raises APO signal to +5 V to turn power on.



POWER SUPPLY CIRCUIT

The power supply circuit generates four voltages as shown in the following table. VDD voltage is always generated. The others are controlled by APO signal from the CPU.

Name	Voltage	For operation of
VDD	+5 V	CPU, Reset IC, Sound source ROM
AVDD	+5.3 V	DAC
AVCC	+12 V	Filter block, Equalizer block
VC	+12 V	Power amplifier

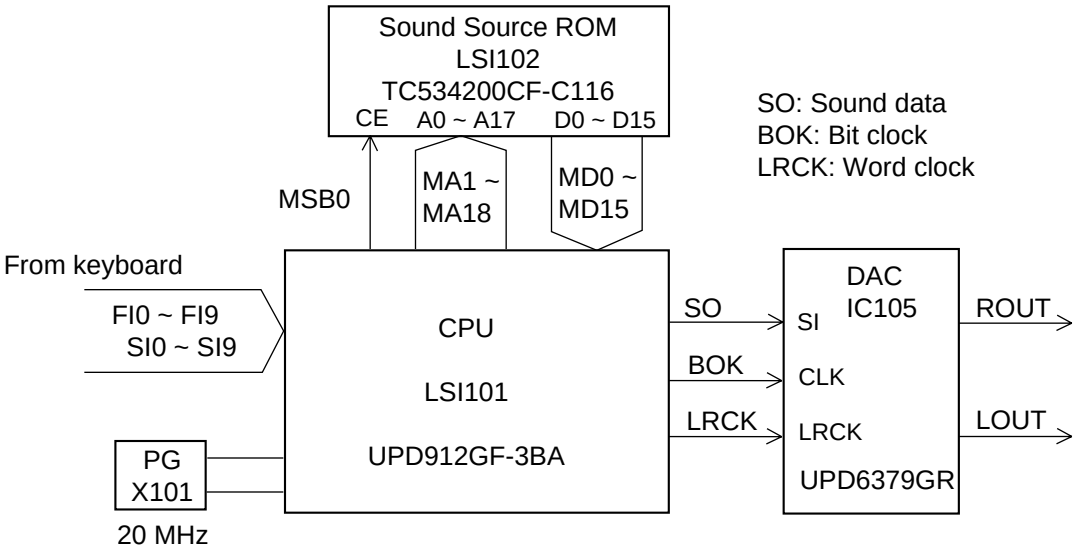
CPU (LSI101: UPD912GF-3BA)

The 16-bit CPU contains a 1k-byte RAM, three 8-bit I/O ports, two timers, a keycontroller and serial interfaces. The CPU detects key velocity by counting the time between first-key input signal FI and second-key SI from the keyboard. The CPU read sound data and velocity data from the sound source ROM in accordance with the selected tone. Then the CPU provides 16-bit serial sound data to the DAC.The CPU also controls MIDI input/output and LED driving.
The following table shows the pin functions of LSI101.

Pin No.	Terminal	In/Out	Function
1	TXD0	Out	MIDI signal input
2	RXD0	In	MIDI signal output
3	SCK0	Out	APO (Auto Power Off) signal output
4 ~ 6		—	Not used. Connected to ground.
7	AVCC	In	Ground (0 V) source
8, 9	AN0, AN1	—	Not used. Connected to ground.
10	AGND	In	Ground (0 V) source
11	BCK	Out	Bit clock output
12	SO	Out	Serial sound data output
13	LRCK	Out	Word clock output
14	GND	In	Ground (0 V) source

Pin No.	Terminal	In/Out	Function
15, 16	XLT0, XLT1	In/Out	20 MHz clock input/output
17	VCC	In	+5 V source
18, 19	MD0, MD1	In	Mode selection terminal. Connected to ground.
20	RSTB	In	Reset signal input
21	NMI	In	Power ON signal input
22	INT	—	Not used. Connected to ground.
23 ~ 30	FI0 ~ FI3 SI0 ~ SI3	In	Key input signal
31 ~ 38	KC0 ~ KC7	Out	Key scan signal output
39 ~ 50	FI4 ~ FI9 SI4 ~ SI9	In	Key input signal
51	FI10	In	Not used
52	SI10	In	Not used
53	KI0	In	Button input signal input
54	KI1	—	Not used
55	KI2	Out	LED drive signal
56 ~ 58		—	Not used
59 ~ 76	MA1 ~ MA18	Out	Address bus
77	MCSB0	Out	Chip enable signal output for the sound source ROM
78, 79		—	Not used
80	VCC	In	+5 V source
81	GND	In	Ground (0 V) source
82	MRDB	Out	Read enable signal output for the sound source ROM
83 ~ 98	MD0 ~ MD15	In/Out	Data bus
99	PLE	In	Sustain signal input
100	P17	In	APO cancellation signal input

Block diagram of digital circuits

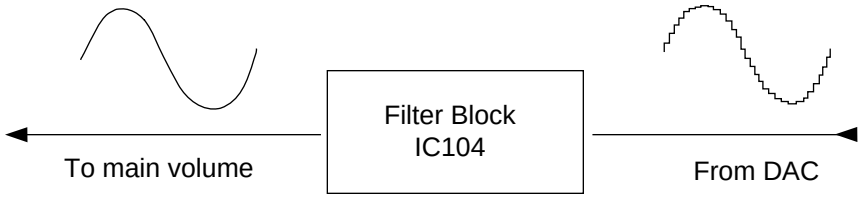


DAC (IC105: UPD6379GR)

The DAC receives 16-bit serial data output from the CPU. The data contains digital sound data of the melody, chord, bass, and percussion for the right and left channels. The DAC converts the data into analog waveforms and output them to each channel separately.

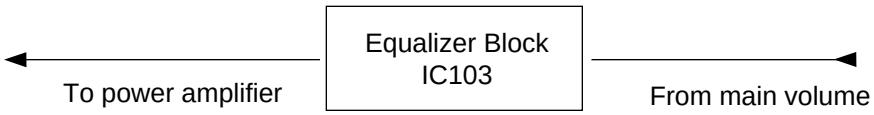
FILTER BLOCK

Since the sound signals from the DAC are stepped waveforms, the filter block is added to smooth the waveforms.



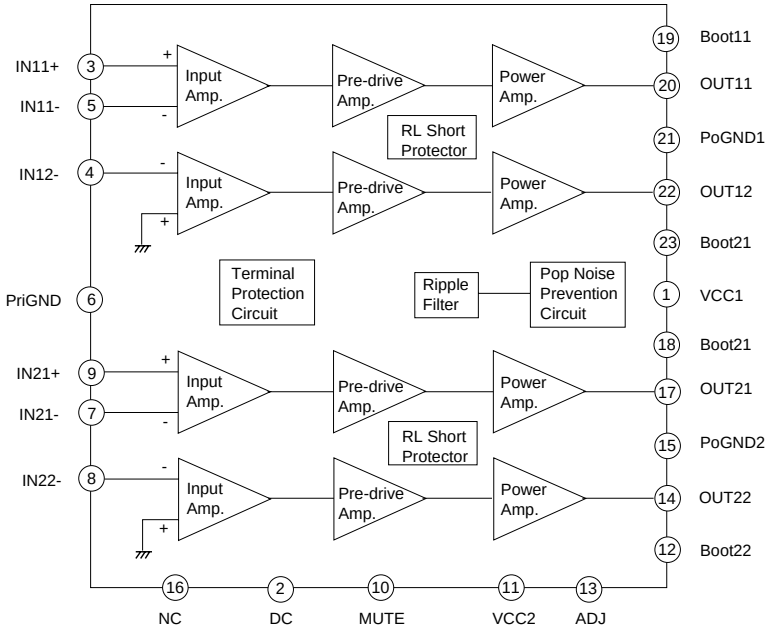
EQUALIZER BLOCK

The equalizer block boots low frequencies to compensate for the reduced response of the built-in speakers.

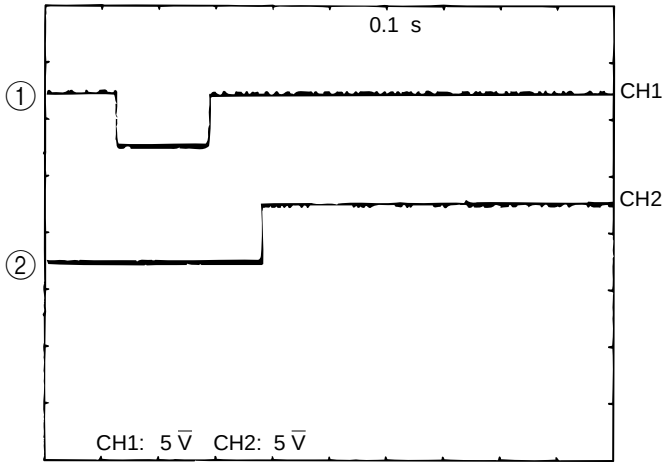


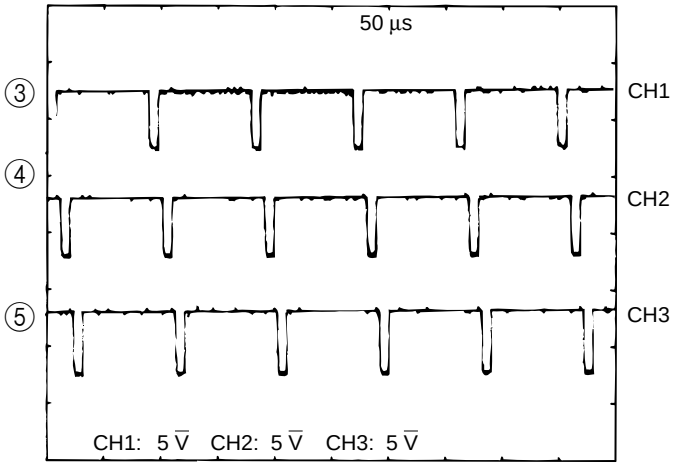
POWER AMPLIFIER (IC102: LA4598)

The power amplifier is a two-channel amplifier with standby switch.



MAJOR WAVEFORMS





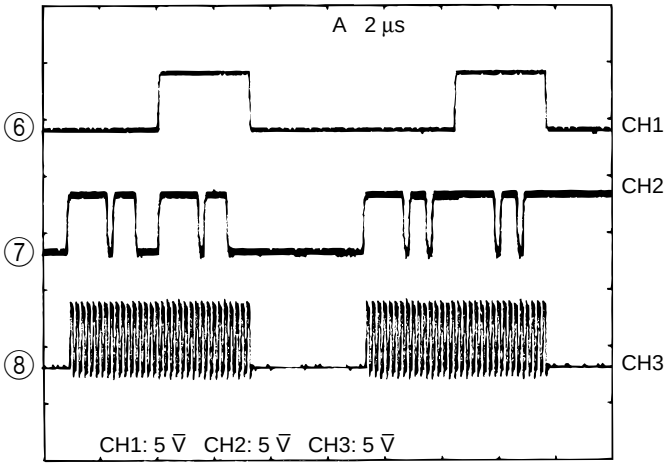
① POWER ON signal
UPD912GF-3BA pin 21

② APO signal
UPD912GF-3BA pin 3

③ Key scan signal KC0
UPD912GF-3BA pin 31

④ Key scan signal KC1
UPD912GF-3BA pin 32

⑤ Key scan signal KC2
UPD912GF-3BA pin 33

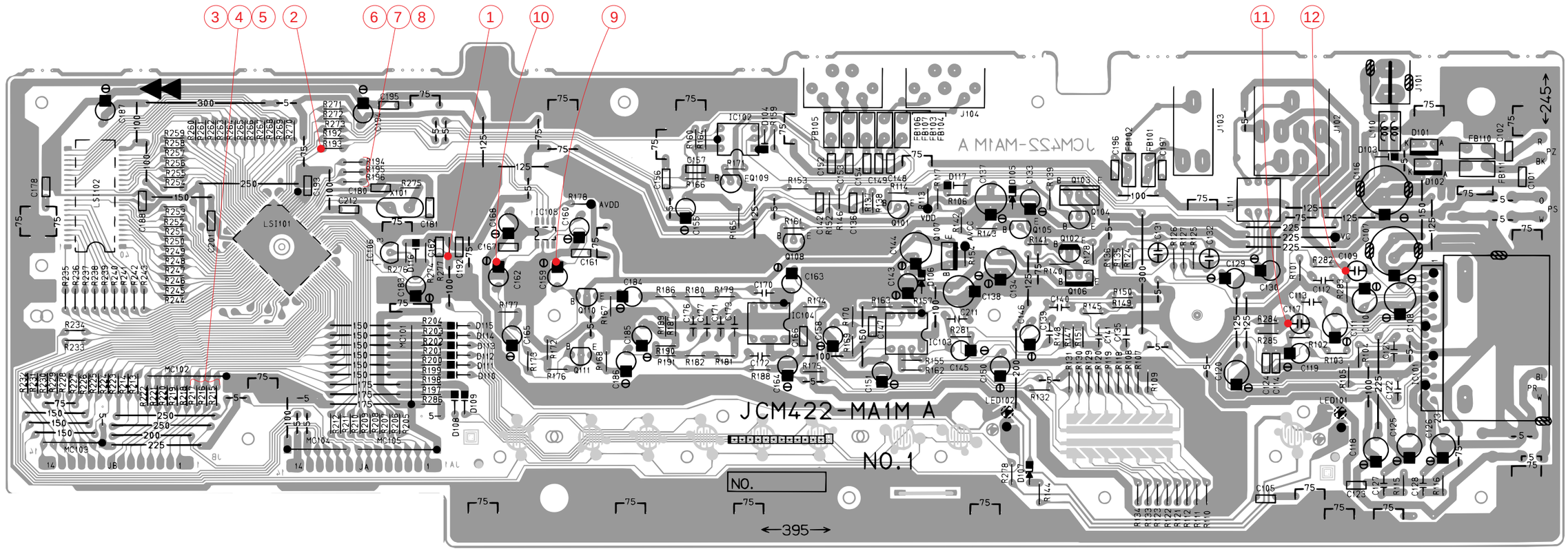


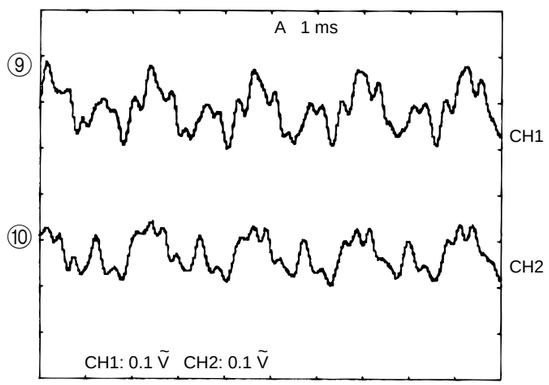
⑥ Word clock LRCK
UPD912GF-3BA pin 13

⑦ Data signal SO
UPD912GF-3BA pin 12

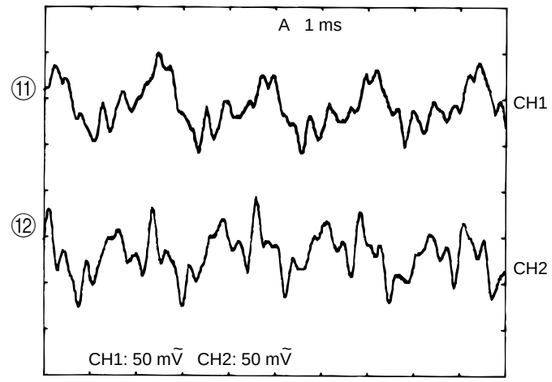
⑧ Bit clock BCK
UPD912GF-3BA pin 11

PCB VIEW AND CHECK PRINTS





Tone: Piano-1
Key: A4
Touch response: Off
Volume: Maximum



⑨ DAC output (R-ch)
UPD6379GR pin 5

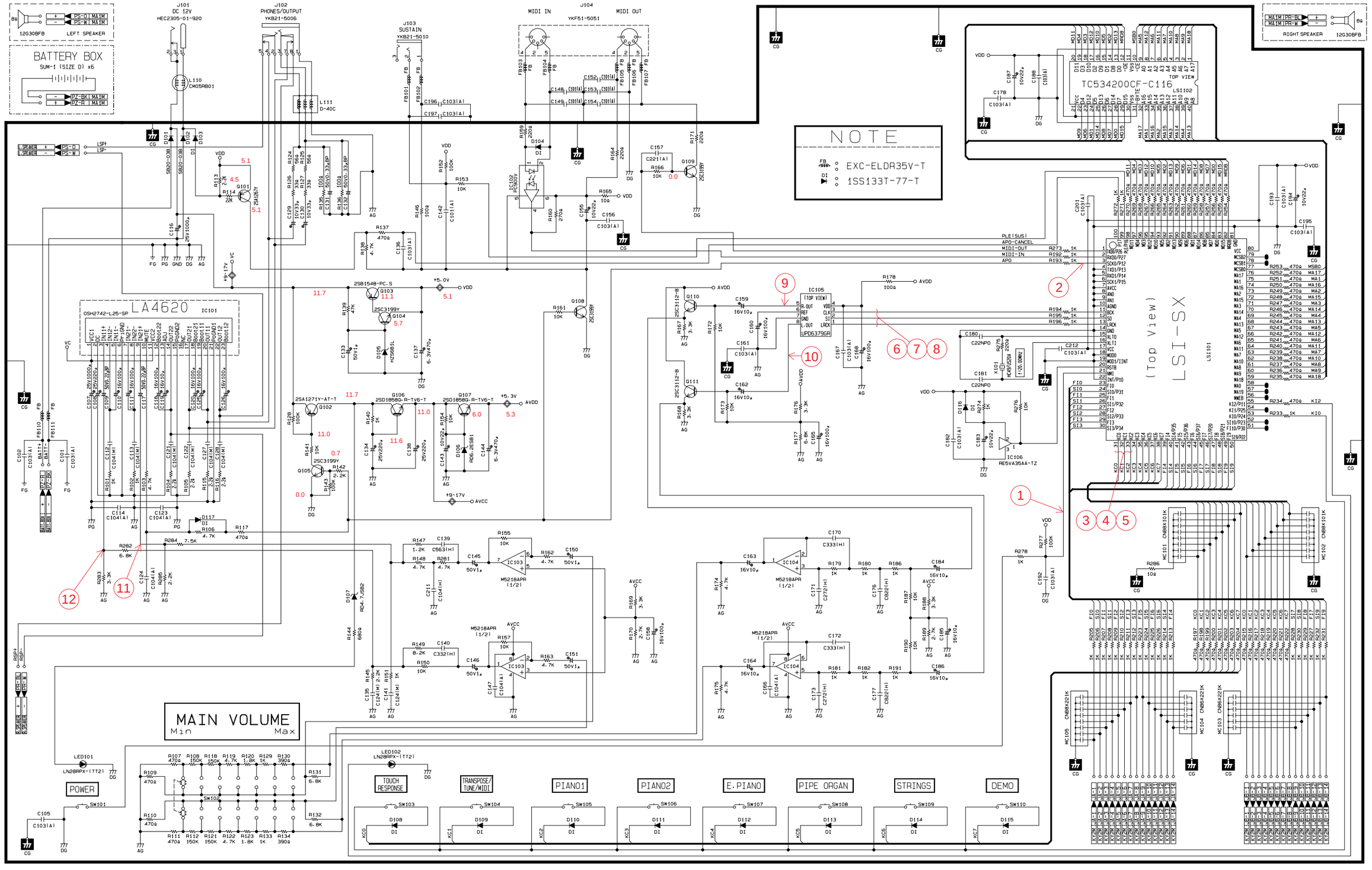
⑩ DAC output (L-ch)
UPD6379GR pin 8

⑪ Equalizer output (R-ch)

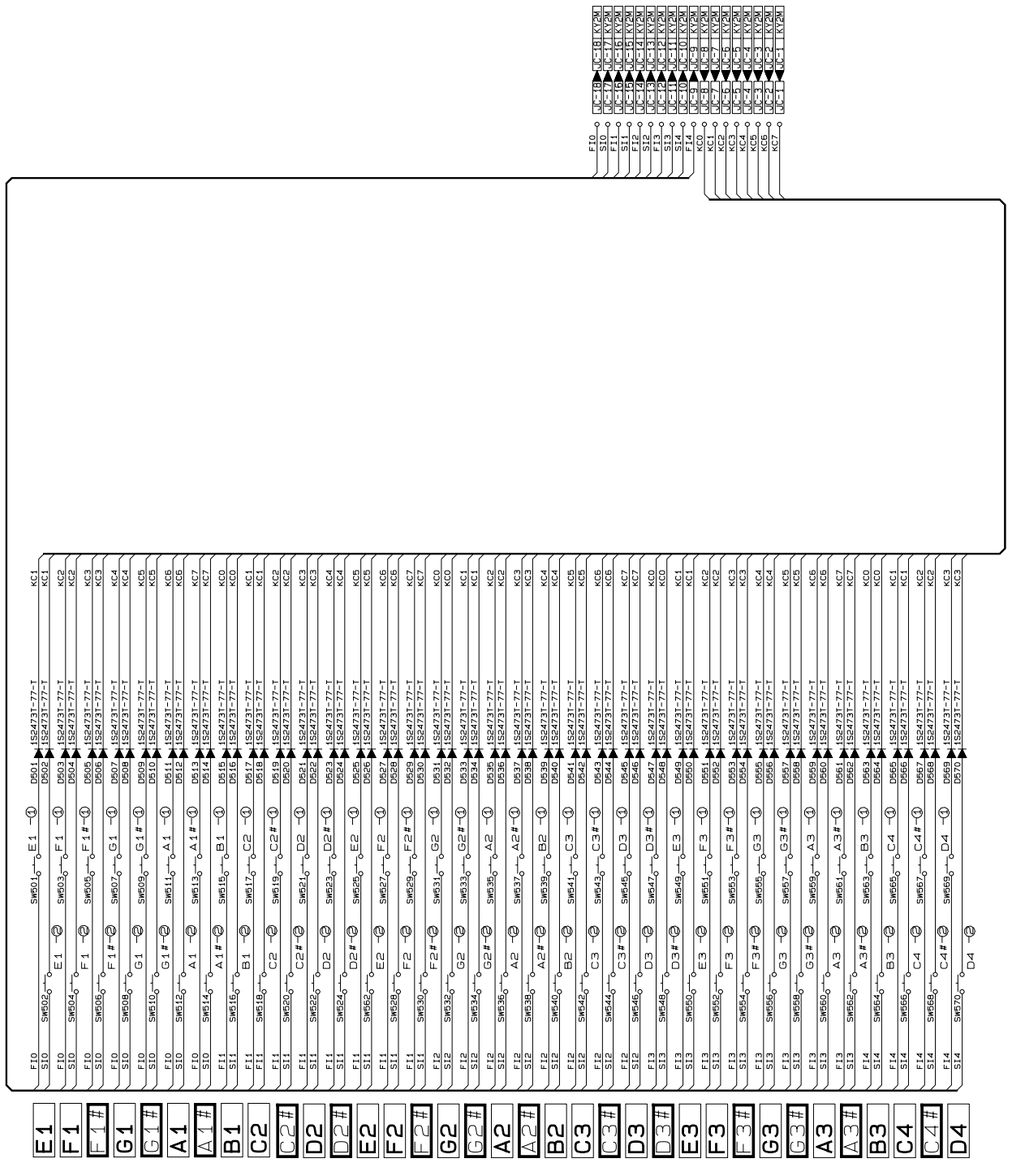
⑫ Equalizer output (L-ch)

SCHEMATIC DIAGRAMS

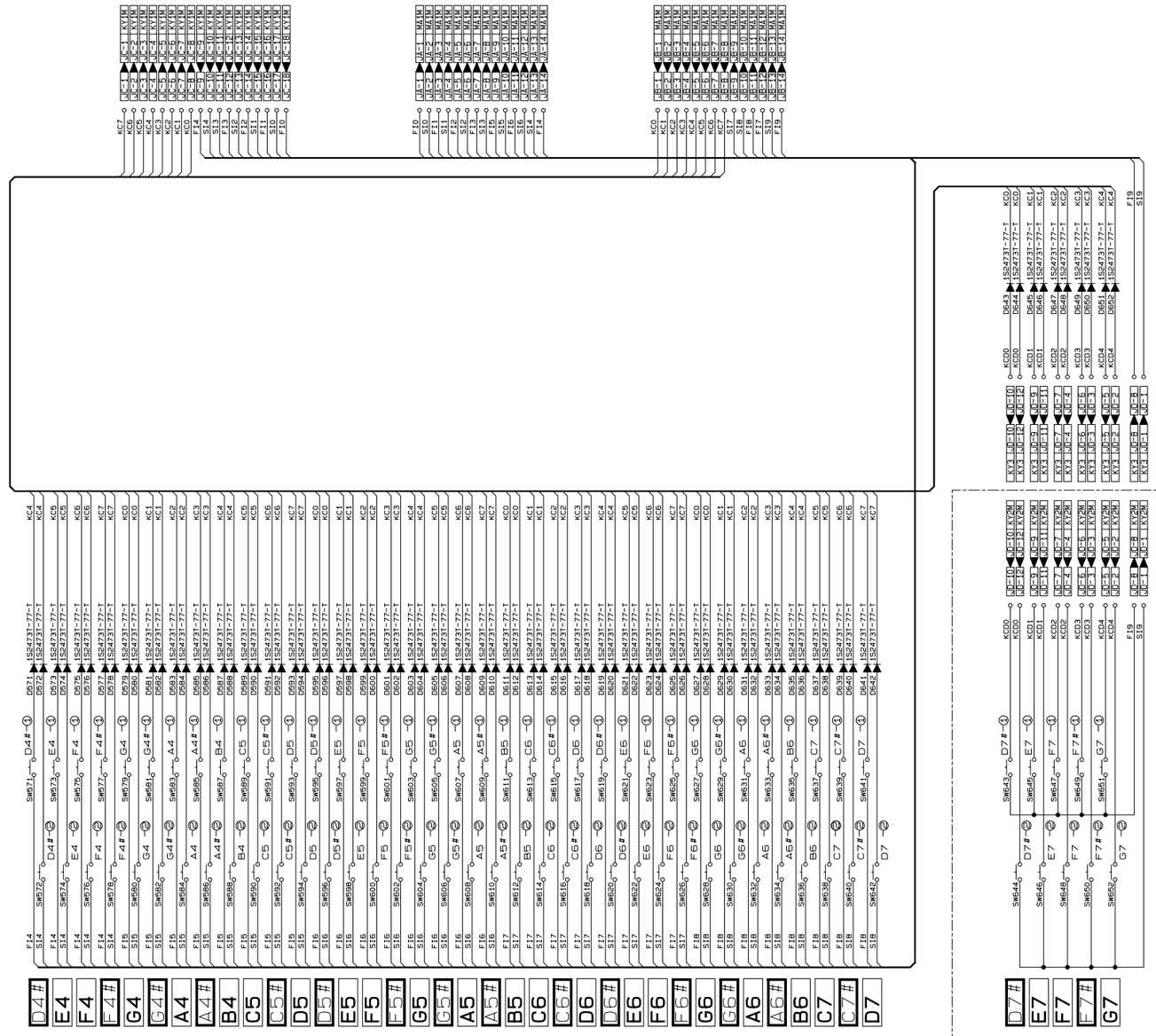
MAIN PCB JCM422-MA1M



KEYBOARD PCBs JCM762T-KY1M/KY2M



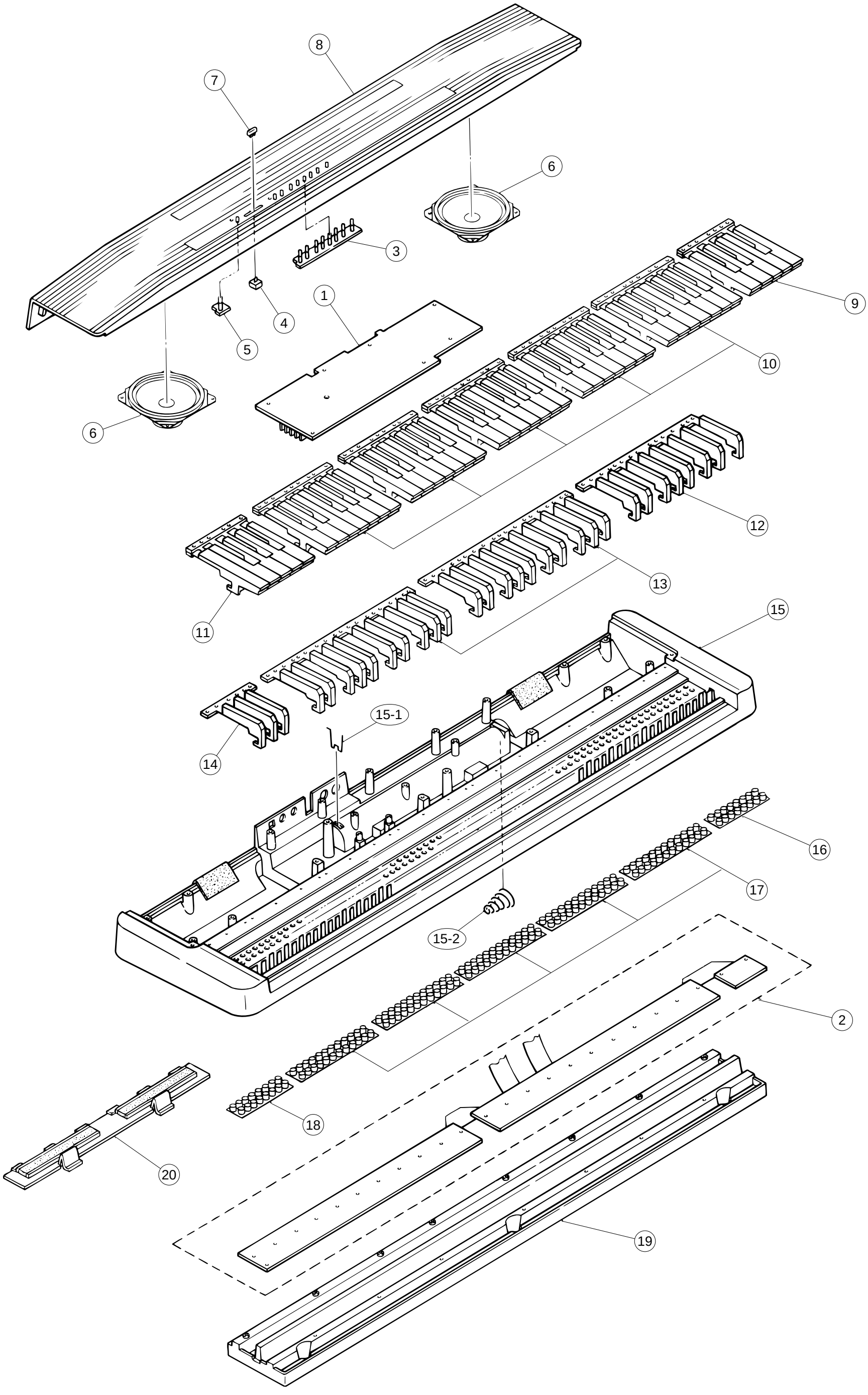
JCM762T-KY1M



JCM762T-KY2M

JCM762T-KY3

EXPLODED VIEW



PARTS LIST

CPS-7

Notes:

1. Prices and specifications are subject to change without prior notice.
2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare parts Supply", published seperately.
3. The numbers in item column correspond to the same numbers in drawing.

N	Item	Code No.	Parts Name	Specification	Q	FOB Japan N.R.Yen Unit Price	R
		Main PCB					
N	1	6923 7620	PCB ass'y JCM422-MA1M	M140249*1	1	5,530	B
	LSI101	2012 0168	LSI	UPD912GF-3BA	1	750	A
N	LSI102	2012 1085	LSI	TC534200CF-C116	1	560	A
	IC105	2105 4249	LSI	UPD6379GR	1	150	A
	IC101	2114 1883	IC	LA4620	1	350	A
	IC102	2114 1421	IC, Photocoupler	PC900V	1	210	B
	IC103/104	2114 1799	IC	M5218APR	2	54	B
	IC106	2105 3941	IC	RE5VA35AA-TZ	1	44	B
	Q101	2200 4409	Transistor	2SA933-SQ-TP-T	1	14	A
	Q102	2250 0168	Transistor	2SA854-SR-TP-T	1	20	A
	Q103	2251 0672	Transistor	2SB1548-P.CS	1	44	A
	Q104/105, Q108/109	2220 1387	Transistor	2SC1740SQ-TP-T	4	13	B
	Q106/107	2253 0448	Transistor	2SD1858Q,R-TV6-T	2	24	A
	Q110/111	2252 0168	Transistor	2SC3112B-TPE2-T	2	15	B
	D101/102	2390 1463	Schottky	SB20-03B	2	39	B
	D103/104, D108~117	2390 1344	Diode	1SS133T-77-T	12	3	C
	D105	2360 1085	Zener diode	HZS6B1LTD-T	1	10	A
	D106	2360 1694	Zener diode	RD6.2ESB1-T1-T	1	8	A
	D107	2310 7996	Zener diode	RD4.7ESB2-T1-T	1	12	B
	LED101/102	2370 0616	LED	LN28RPX-(TT2)	2	16	B
	X101	2590 2009	Crystal oscillator	HC-49/US20A	1	110	B
	J101	3501 5012	Jack, Power	HEC2305-01-920	1	25	A
	J102	3612 0665	Jack, Phone	YKB21-5006	1	60	A
	J103	3612 0789	Jack	YKB21-5010	1	60	B
	J104	3501 4816	Jack, DIN	YKF51-5051	1	110	B
	MC101/102	2845 0168	Module capacitor	CNB8X101K	2	58	C
	MC103/104	2845 0056	Module capacitor	CNB6X221K	2	43	C
	MC105	2845 0049	Module capacitor	CNB8X221K	1	58	C
		Keyboard PCBs					
N	2	6923 7630	PCB ass'y M762T-KY123M	M140251*1	1	1,370	B
	D501~652	2301 0101	Diode	1S2473-T-77-T	152	8	C
		Mechanical Parts					
N	3	6923 7680	Rubber button, 8-contact	M240177-1	1	130	B
	4	6909 5890	Slide contact	CSB-12D	1	28	B
N	5	6923 7670	Rubber button, 1-contact	M340202-1	1	43	B
	6	3831 0672	Speaker	12G30BFB	2	330	B
N	7	6923 7650	Switch knob	M340203-1	1	19	B
N	8	6923 7660	Panel, Top	M240225*1	1	930	C
N	9	6923 7900	White key set, CDEFG	M340231*1	1	150	A
	10	6922 2720	White key set, 1-octave	M312118*1	5	100	A
N	11	6923 7910	White key set, SFGAB	M340230*1	1	160	A
N	12	6923 7940	Black key set, 8-key	M111726-4	1	120	A
	13	6922 2740	Black key set, 10-key	M111726-1	2	120	A
N	14	6923 7930	Black key set, 3-key	M111726-3	1	85	A
N	15	6923 7862	Case	M140239B*1	1	1,750	C
	15-1	6903 2150	Battery spring, (+)	M41330-1	1	18	B
	15-2	6902 6140	Battery spring, (-)	M41226-1	1	27	B
N	16	6923 8000	Key contact rubber, C-G	M240182-1	1	110	B

Notes: N – New parts
Q – Quantity used per unit
R – Rank

N	Item	Code No.	Parts Name	Specification	Q	FOB Japan N.R.Yen Unit Price	R
	17	6922 2761	Key conatct rubber, 1-octave	M211704A-1	5	89	B
N	18	6923 7970	Key contact rubber, E-B	M240181-1	1	110	B
N	19	6923 7640	Bottom case	M240223*1	1	710	C
	20	6918 1636	Battery cover	M311164F*1	1	200	B
		Accessories					
N		6924 1840	Music stand	M340328*1	1	880	C
N		6924 1870	Stand	CS-40P	1	3,200	C
N		1909 9792	Screw set for CS-40P	CS-40P-S	1	530	B

Notes: N – New parts
Q – Quantity used per unit
R – Rank

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MA0900951A